

## Description

# Bag for Transporting Moisture-Sensitive Goods

### BACKGROUND OF INVENTION

[0001] 1. Field of the Invention.

[0002] The invention relates to a bag for transporting moisture-sensitive goods, in particular, plastics granules.

[0003] 2. Description of the Related Art.

[0004] The bag wall of a prior art bag is comprised of several layers, including a layer of kraft paper having supporting properties and an inner layer of a thermoplastic film forming a vapor barrier. The manufacture of such multi-layer bags is extremely complex and expensive. Moreover, permanent strength properties and the reliability of the vapor barrier effect are often unsatisfactory.

### SUMMARY OF INVENTION

[0005] It is an object of the invention to provide a bag of the aforementioned kind that can be manufactured quickly

and inexpensively on conventional manufacturing machines, wherein the bag has an extended service life with a reliable vapor barrier effect.

[0006] In accordance with the present invention, this is achieved in that the bag wall is comprised of a unilayer multi-ply laminate comprising an outer ply of crepe paper, a central ply of a barrier material forming a vapor barrier, and an inner ply of weldable thermoplastic material.

[0007] In the bag according to the invention the inner film layer, if needed together with the central ply of barrier material, forms the supporting ply within the unilayer laminate while the exterior ply of crepe paper functions essentially as an information carrier and an anti-slip device. The bag can be manufactured on conventional bag manufacturing machines, is permanently seal-tight and has a high strength.

#### **BRIEF DESCRIPTION OF DRAWINGS**

[0008] Fig. 1 shows a shortened perspective view of a bag with open upper end of the bag.

[0009] Fig. 2 shows a shortened sectional view of a bag wall provided with a longitudinal closure seam.

[0010] Fig. 3 shows a shortened sectional view for illustrating the multi-ply configuration of the unilayer laminate composite

of the bag wall.

## DETAILED DESCRIPTION

- [0011] The bag 1, designed for transporting moisture-sensitive goods, in particular, plastic granules, has a bag wall of a unilayer multi-ply laminate. The outer ply 2 is comprised of crepe paper, a central ply 3 is made of a barrier material forming a vapor barrier, and the inner ply 4 is comprised of a weldable thermoplastic material, preferably, polyethylene. The plies 2 and 3 are connected by means of a bonding agent ply 5, and the plies 3 and 4 by means of a bonding agent ply 6.
- [0012] The crepe paper forming the outer ply has a grammage of approximately  $70 \text{ g/m}^2$  to  $110 \text{ g/m}^2$ , preferably approximately  $90 \text{ g/m}^2$ , and forms the protective ply of the laminate.
- [0013] The central ply 3 forming the vapor barrier is preferably aluminum foil. Instead of the aluminum foil, it is also possible to employ metallized (metal-coated) PET (polyethylene terephthalate) film or PP (polypropylene) film. A polyester or polyvinyl alcohol film can also be used as a central ply 3.
- [0014] The plies 3, 4 of the laminate are lined by pasting or by extrusion, wherein the linings form the bonding agent

plies 5 and 6. In the case of extrusion lining, the central ply 3 is preferably bonded between two films of polyethylene that is advantageously of the type M-LLDPE (metallocene linear low-density polyethylene). The polyethylene ply forming the bonding agent ply 5 between the outer ply 2 and the central ply 3 has preferably a grammage of approximately  $20 \text{ g/m}^2$  to  $40 \text{ g/m}^2$ , preferably approximately  $30 \text{ g/m}^2$ , while a polyethylene ply forming the bonding agent ply 6 between the central layer 3 and the inner layer 4 has preferably a grammage of approximately  $70 \text{ g/m}^2$ , to  $100 \text{ g/m}^2$ , preferably approximately  $85 \text{ g/m}^2$ . It forms the primary supporting ply within the laminate.

[0015] The bag is advantageously formed as a gusseted bag wherein the outer fold edges 7, 8 and 9, 10 of the gussets 11, 12, respectively, are displaced in the transverse direction relative to one another. The displacement in this connection is 2 mm – 5 mm, preferably approximately 3 mm. Accordingly, the outer fold edges 7,8 or 9, 10 of the gussets 11, 12 are relieved of pressure loads and the resulting damages that can occur when the bags 1, lying flat, are stored in a stack before they are filled.

[0016] The bag wall has a longitudinal closure seam (seal) which

is advantageously formed as a fin seal 13. The seam area of the fin seal 13 is folded onto the outer side of the bag wall and glued thereto, wherein the glue or adhesive for the fixation of the seam area is a hotmelt adhesive 20 that is PU (polyurethane) based. Such a fin seal 13 is especially resistant under load because it does not spring open and does not have the tendency to peel open.

[0017] In the filled state, the bag 1 is closed off at both ends by means of staggered bottom flaps 14 or 15. They are formed in that a first wall 16 of the bag 1 extends past the terminal edges 17, 18 of the gussets 11, 12 and a second wall 19 of the bag is staggered relative to the first wall 16 and ends below the terminal edges 17, 18 of the gussets. This is shown in Fig. 1 for the upper staggered bottom flap 14; the lower bottom flap 15 is identically designed.

[0018] In the closed state the bottom flaps 14, 15 are glued to the front wall 19 (bottom flap 14) or the rear wall 16 (bottom flap 15) by means of a hot melt adhesive 20, preferably a PU-based one; this is illustrated in connection with the bottom flap 14. The folding lines for the bottom flaps 14, 15 are positioned such that they extend at a spacing relative to the edge 21 of the wall 16 or 19

facing the bottom flaps 14, 15.

[0019] Despite the configuration of the bag wall as a unilayer but multi-ply laminate, the bag wall is stable enough in order to withstand all loads during use. The use of crepe paper for the outer ply provides an elasticity which prevents the formation of tears even under strong stretching or expansion loads. In situations in which the expansion loads play a smaller role, the outer layer 2 can also be formed of kraft paper that is not creped. The outer paper ply ensures in any case that the bags, when stacked, have a relatively strong resistance against slipping and sliding. In this connection, the outer ply 3 provides a suitable information carrier for informative printed messages and labels.

[0020] At the same time, the outer ply 3 provides a protective function for the heat-sensitive plies arranged inside, in particular, the polyethylene ply 5, when the bags are sealed at the customer facility by use of radiation heat. The bag is absolutely seal-tight so that moisture-sensitive goods in the interior of the bag are protected safely from penetration of moisture.

[0021] While specific embodiments of the invention have been shown and described in detail to illustrate the inventive

principles, it will be understood that the invention may be embodied otherwise without departing from such principles.